

Name: \_\_\_\_\_

## at1124exam: Radicals and Squares (v825)

### Question 1

Simplify the radical expressions.

$$\sqrt{27}$$

$$\sqrt{12}$$

$$\sqrt{75}$$

$$\frac{\sqrt{3 \cdot 3 \cdot 3}}{3\sqrt{3}}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 3}}{2\sqrt{3}}$$

$$\frac{\sqrt{5 \cdot 5 \cdot 3}}{5\sqrt{3}}$$

### Question 2

Find all solutions to the equation below:

$$\frac{(x+8)^2 - 9}{2} = 20$$

First, multiply both sides by 2.

$$(x+8)^2 - 9 = 40$$

Then, add 9 to both sides.

$$(x+8)^2 = 49$$

Undo the squaring. Remember the plus-minus symbol.

$$x+8 = \pm 7$$

Subtract 8 from both sides.

$$x = -8 \pm 7$$

So the two solutions are  $x = -1$  and  $x = -15$ .

### Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 10x = 56$$

$$x^2 + 10x + 25 = 56 + 25$$

$$x^2 + 10x + 25 = 81$$

$$(x + 5)^2 = 81$$

$$x + 5 = \pm 9$$

$$x = -5 \pm 9$$

$$x = 4 \quad \text{or} \quad x = -14$$

### Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 - 20x + 56$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 - 10x) + 56$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 - 10x + 25 - 25) + 56$$

Factor the perfect-square trinomial.

$$y = 2((x - 5)^2 - 25) + 56$$

Distribute the 2.

$$y = 2(x - 5)^2 - 50 + 56$$

Combine the constants to get **vertex form**:

$$y = 2(x - 5)^2 + 6$$

The vertex is at point (5,6).